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10/708,905	03/31/2004	**Ibrahim M. Mohamed**	H0005395	2904

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EXAMINER	
FINDLEY, CHRISTOPHER G	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/708,905	MOHAMED ET AL.	
	Examiner	Art Unit	
	CHRISTOPHER FINDLEY	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Examiner notes that claim 28 has been cancelled and claim 29 has been added via the amendment filed 5/21/2008.

Response to Arguments

2. Applicant's arguments filed 5/21/2008 have been fully considered but they are not persuasive.

3. Re claim 16, the Applicant contends that steps 302-306 utilize histograms representing visual content, not any difference of the visual content. While the Examiner agrees that the cited steps do not reflect differences between frames, the Examiner respectfully disagrees with the Applicant's assertion that Toklu fails to teach or suggest this aspect. Toklu discloses that camera motion information between consecutive frames of the segment is estimated (Toklu: Fig. 2B, step 212; column 8, lines 3-8). Therefore, the camera motion corresponds to the difference between two frames. Toklu further discloses sequentially determining a cumulative sum of motion in the frame (Toklu: Fig. 2B, step 219; column 10, lines 23-47), wherein the amount of motion corresponds to a rate of change in the frame.

4. Re claim 1, the Applicant contends that Toklu fails to teach or suggest that the rate of change calculations are repeated for each of the frames in the video sequence. However, the Examiner respectfully disagrees. Toklu discloses that the camera motion is summed for each frame (Toklu: column 10, lines 32-35) and that camera motion information between consecutive frames of the segment is estimated (Toklu: Fig. 2B,

step 212; column 8, lines 3-8). Therefore, the reference changes corresponding to each frame of the sequence.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-2, 14-17, 23-24, and 29 are rejected under 35 U.S.C. 102(a) as being anticipated by Toklu et al. (US 6549643 B1).

Re **claim 1**, Tolku discloses a method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said method comprising: determining a rate of change of visual content of each current frame from a corresponding reference frame, each of said current frame and said reference frame being comprised in said sequence of image frames (Toklu: Fig. 2B, step 212), wherein said rate of change represents a difference of a first value and a second value, said first value representing a change of visual content of a current frame compared to a first frame, said second value representing a change of visual content of said first frame compared to a second frame, wherein said second frame is a

reference frame for said first frame and said first frame is a reference frame for said current frame (Toklu: column 8, line 15, through column 9, line 9, calculating an amount of motion between two frames; Toklu: column 9, lines 13-31 and Eqn. 7, motion activity found is then used to generate a motion activity (MA) curve; Toklu: Fig. 3, the potential key frames undergo an elimination process; Toklu: column 13, lines 14-29, the histograms for candidate frames are compared with the histogram for a reference frame, wherein the motion activity for the candidate frame represents a first value, and the reference frame represents a second value, which are compared for the purpose of determining key frames); and selecting said current frame as a corresponding one of a set of potential video frames (Toklu: Fig. 2B, step 223) if said rate exceeds a corresponding first threshold value (Toklu: Fig. 2B, steps 220-222), wherein said plurality of key video frames are selected from said set of potential video frames (Toklu: Fig. 2A, step 209 refines key frame results from steps 218, 223, and 225 of Fig. 2B), wherein said determining and said selecting are repeated for each of said sequence of image frames as said current frame to form said set of potential video frames (Toklu: column 10, lines 54-57), wherein each of the respective first frame and the respective second frame are different for different ones of the current frame in said sequence of image frames (Toklu: Fig. 2B, step 212; column 8, lines 3-8, camera motion information between consecutive frames of the segment is estimated; column 10, lines 32-35, camera motion is summed for each frame).

Re **claim 2**, Tolku discloses a majority of the features of claim 2, as discussed above in claim 1, and Toklu additionally discloses determining a displacement

magnitude of each moved pixel of said current frame compared to the position in said first frame and of said first frame compared to the position in said second frame (Toklu: column 8, line 15, through column 9, line 9, calculating an amount of motion between two frames); and computing a first representative magnitude of said displacement magnitude for said moved pixels of said current frame compared to said first frame, and a second representative magnitude of said displacement magnitude for said moved pixels of said first frame compared to said second frame (Toklu: column 8, line 15, through column 9, line 9, calculating an amount of motion between two frames; Toklu: column 9, lines 13-31 and Eqn. 7, motion activity found is then used to generate a motion activity (MA) curve), wherein said first value and said second value respectively equal said first representative magnitude and said second representative magnitude such that said rate is computed as a difference of said first representative magnitude and said second representative magnitude (Toklu: Fig. 3, the potential key frames undergo an elimination process; Toklu: column 13, lines 14-29, the histograms for candidate frames are compared with the histogram for a reference frame, wherein the motion activity for the candidate frame represents a first value, and the reference frame represents a second value, which are compared for the purpose of determining key frames).

Re **claim 14**, Toklu discloses that the corresponding first frame and the corresponding second frame are selected at a same respective relative position in comparison to the position of the current frame such that each of the respective first frame and the respective second frame are different for different current frame (Toklu:

Fig. 2B, step 212; column 8, lines 3-8, camera motion information between consecutive frames of the segment is estimated; column 10, lines 32-35, camera motion is summed for each frame).

Re **claim 15**, Tolku discloses that said current frame, said first frame and said second frame are in consecutive successive positions in said sequence of frames (Toklu: Fig. 2B, step 212; column 8, lines 3-8, camera motion information between consecutive frames of the segment is estimated; column 10, lines 32-35, camera motion is summed for each frame).

Re **claim 16**, arguments analogous to those presented for claim 1 are applicable to claim 16, and, therefore, claim 16 has been analyzed and rejected with respect to claim 1 above.

Claim 17 has been analyzed and rejected with respect to claim 2 above.

Re **claim 23**, arguments analogous to those presented for claim 1 are applicable to claim 23, and, therefore, claim 23 has been analyzed and rejected with respect to claim 1 above.

Claim 24 has been analyzed and rejected with respect to claim 2 above.

Re **claim 29**, Toklu discloses a method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said method comprising: receiving said sequence of frames of a same scene/area of interest according to a sequential order (Toklu: Fig. 2A, step 200);

choosing one of said sequence of image frames as a current frame, a first flame being before said current flame and a second flame being before said first flame according to said sequential order, said first flame being at a first relative position in relation to said first flame in said sequential order and said second flame being at a second relative position in relation to said first flame in said sequential order (Toklu: Fig. 2B, step 212; column 8, lines 3-8, camera motion information between consecutive frames of the segment is estimated; column 10, lines 32-35, camera motion is summed for each frame); calculating a difference of a first value and a second value, said first value representing a measure of a change of visual content of said current flame compared to said first frame, and said second value representing a measure of a change of visual content of said first flame compared to a second frame (Toklu: Fig. 2B, step 212); selecting said current flame as a corresponding one of said plurality of key video frames if said difference exceeds a first threshold value and first value exceeds a second threshold value (Toklu: Fig. 2B, steps 220-223; Fig. 2A, step 209; Fig. 4, steps 405-407); and repeating said calculating and said selecting after choosing each of said sequence of image frames as said current frame to form said plurality of key video frames (Toklu: Fig. 2B, step 212, camera motion estimated between consecutive frames for each segment; Fig. 4, step 409, elimination process repeated for each segment), wherein each of the respective first frame and the respective second frame are different for different ones of the current frames, and are respectively determined based on the same first relative position and said second relative position in reference to the corresponding current frame (Toklu: Fig. 2B, step 212; column 8, lines 3-8, camera

motion information between consecutive frames of the segment is estimated; column 10, lines 32-35, camera motion is summed for each frame).

7. Claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 are rejected Under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2).

Re **claim 3**, Toklu discloses a majority of the features of claim 3, as discussed above in claim 2 but Toklu does not explicitly state that said first representative magnitude for said current frame equals an average of motion energy vector magnitudes of said moved pixels of said current frame in comparison with corresponding pixels of said first frame. However, Zhang discloses a method for extracting key frames from video using a triangle model of motion based on perceived motion energy, where the average magnitude of the motion vectors for a particular frame is calculated (Zhang: column 9, lines 25-38), and the average magnitude is used to calculate the perceived motion energy (Zhang: column 9, lines 39-49). Since both Tolku and Zhang relate to selecting key video frames based on motion analysis, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the triangle method of Zhang with the histogram analysis of Tolku in order to provide a uniform and consistent selection method that yields a proper number of key frames that are most representative of the video sequence content (Zhang: column 5, lines 34-37). The combined method of Tolku and Zhang has all of the features of claim 3.

Re **claim 4**, the combined method of Tolku and Zhang discloses a majority of the features of claim 4, as discussed above in claim 3. Additionally, Toklu discloses that said first threshold value is the same for all of said current frames (Toklu: Fig. 2B, when the cumulative motion in steps 220, 221, and 222 exceeds a threshold, the frame is selected as a key frame in step 223), said selecting further comprises: including said current frame is in said set of potential video frames only if said first representative magnitude exceeds a second threshold (Toklu: Fig. 2A, step 209 eliminates substantially similar frames; column 7, lines 56-65, elimination methods are shown in Figs. 3 and 4; Fig. 4, step 405, indicates a difference threshold); and including only those of said set of potential video frames, which exceed said first threshold, in said plurality of key video frames (Toklu: Fig. 4, steps 405 and 406, if the motion is not significant, the candidate frame is eliminated).

Re **claim 6**, the combined method of Tolku and Zhang discloses identifying a plurality of active pixels in said current frame, wherein; a pixel is considered an active pixel if a corresponding displacement magnitude is outside of a range, wherein only said plurality of active pixels are used by said computing (Toklu: Fig. 2C, step 231).

Re **claim 9**, the combined method of Tolku and Zhang discloses enabling a user to specify one of a plurality of key video frames, wherein said plurality of key video frames are selected by said selecting (Zhang: Fig. 1, element 120; column 5, lines 43-44, indicate that the user may use the key frames to select the desired section of the video for display); and displaying said specified one of said plurality of key video frames

(Zhang: Fig. 1, element 120; column 5,-lines 43-44, indicate that the user may use the key frames to select the desired section of the video for display).

Re **claim 10**, the combined method of Tolku and Zhang discloses displaying a prior key video frame and a next key video frame in relation to said specified one of said plurality of key video frames, wherein said prior key video frame and said next key video frame are comprised in said plurality of key video frames (Zhang: Fig. 1, element 120, key frames are displayed in a sequence).

Re **claim 11**, the combined method of Tolku and Zhang discloses generating a display indicating the manner in which said plurality of key video frames are interspersed in said sequence of image frames, wherein said enabling is based on said display (Zhang: Fig. 12, the key frames are shown along with their corresponding frame numbers).

Re **claim 13**, the combined method of Tolku and Zhang discloses generating a display listing said plurality of key video frames, wherein said enabling is based on said display (Zhang: Fig. 1, element 120; column 5, lines 43-44).

Claim 18 has been analyzed and rejected with respect to claim 3 above.

Claim 19 has been analyzed and rejected with respect to claim 4 above.

Claim 21 has been analyzed and rejected with respect to claim 6 above.

Claim 25 has been analyzed and rejected with respect to claim 3 above.

Claim 26 has been analyzed and rejected with respect to claim 4 above.

8. Claims 5, 7, 8, 20, 22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2) as applied to claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 above, and further in view of Ma et al. (US 20040088723 A1).

Re **claim 5**, the combined method of Tolku and Zhang discloses a majority of the features of claim 5, as discussed above in claims 1-4, but does not specifically disclose that the first threshold and the second threshold are adjusted dynamically to ensure that a desired number of frames are selected as key video frames in a specified duration. However, Ma discloses a method for generating a video summary, where a binarization threshold is estimated in an adaptive manner (Ma: paragraph [0081]) when analyzing a video sequence for selecting key frames. Since Tolku, Zhang, and Ma relate to selecting key frames in a video sequence, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the attention modeling of Ma with the combined key frame selection method of Tolku and Zhang in order to create a representative video summary consisting of very short video clips, which contain the video immediately preceding and immediately following key frames that have been selected (Ma: Fig. 20). The combined method of Tolku, Zhang, and Ma has all of the features of claim 5.

Re **claim 7**, the combined method of Tolku, Zhang, and Ma discloses that said range set by a distance of two times the variance from the mean of a distribution (Ma: paragraphs [0081]-[0082], the threshold is a function of the variance).

Re **claim 8**, the combined method of Tolku, Zhang, and Ma discloses that said representative magnitude comprises an average of said active pixels (Ma: equation (12) and paragraph [0084]).

Claim 20 has been analyzed and rejected with respect to claim 5 above.

Claim 22 has been analyzed and rejected with respect to claim 7 above.

Claim 27 has been analyzed .and rejected with respect to claim 5 above.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2) as applied to claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 above, and further in view of Sull et al. (US 20060064716 A1).

Re **claim 12**, the combined method of Tolku and Zhang discloses a majority of the features of claim 12, as discussed above in claims 1-4, 6, and 9-11, but does not specifically disclose that the display comprises a pie chart. However, Sull discloses techniques for navigating multiple video streams, where textual/visual information, such as a pie chart, may be displayed along with poster-thumbnails on the video selection screen for the user interface (Sull: paragraph [0307]). Since Tolku, Zhang, and Sull all relate to representative images for video sequences, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the textual information of Sull with the key frame selection of the combined method of Tolku and Zhang in order to provide the user with more information, such as date and time of broadcast (Sull: paragraph [0307]), for improving the user's ability to quickly find the desired video

segment (Zhang: column 5, lines 44-45). The combined method of Tolku, Zhang, and Sull has all of the features of claim 12.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Feature based hierarchical video segmentation; Bozdagi et al. (US 6493042 B1)

b. Method of selecting key-frames from a video sequence; Wilf et al. (US 7184100 B1)

c. System for automatic video segmentation and key frame extraction for video sequences having both sharp and gradual transitions; Zhang et al. (US 5635982 A)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER FINDLEY whose telephone number is (571)270-1199. The examiner can normally be reached on Monday through Friday, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on 571-272-7905. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/ SPE Art Unit 2621
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